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SWINE HUSBANDRY IN CENTRAL ALBERTA

RESULTS FROM THIRTEEN YEARS OF EXPERIMENT AT THE DOMINION EXPERIMENTAL STATION LACOMBE, ALBERTA

BY

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TABLE OF CONTENTS

	Page
Introduction	3
Breeds and breeding: Yorkshires, Berkshires, Duroc-Jerseys, and Tamworths	3
Sale of breeding stock to farmers	4
Exhibition work	4
Cross-breeding	4
Prolificacy of the different breeds and crosses	5
Production of hogs during different periods of the year	7
Spring and fall litters	7
Analysis of farrowing results in different periods of the year	8
Feeds and feeding	10
Home-grown feeds	10
Purchased feeds	11
The herd boar	11
Feeding the brood sow	12
Weaning period	13
Developing breeding stock	13
Feeding the market pig	13
Experimental feeding	14
Self-feeding vs. trough-feeding for bacon production	14
Inside vs. outside feeding in winter	15
Feeds for weaned pigs	16
Effect of oat hulls on growth of pigs	18
Comparison of common barley vs. hulless barley	20
Value of frosted wheat	21
Feeding minerals	21
Comparison of breeds and crosses in feeding tests	23
Pasture and pasture crops for hogs	24
Hogs make cheapest gains on pastures	26
Palatability of pasture important	27
Rates of seeding for pasture crops	27
Cost studies	27
Cost of raising and maintaining sows	27
Cost of pork production	28
Housing	28
Housing the brood sow	29
Housing the herd boar	30
Housing the young stock	30
Sanitation	30
Worms	31
Lung-worm	31
Lice	31
Sunscalding	32
Summary of some of the main points in the preceding pages	32

THE MAIN PIGGERY AT THE DOMINION EXPERIMENTAL STATION, LACOMBE.

SWINE HUSBANDRY IN CENTRAL ALBERTA

INTRODUCTION

The Dominion Experimental Station, Lacombe, Alberta, was established in the year 1907, but it was not until the year 1913 that the herd of hogs was started, when four Yorkshire sows were brought to the Station from the Central Experimental Farm, Ottawa, and a Berkshire sow purchased, marking the beginning of the extensive breeding and experimental work that has been carried on since that time. The swine-breeding and experimental projects did not become thoroughly established until 1915 when the first experimental data were recorded and both herds were considerably increased. During later years herds of Duroc-Jerseys and Tamworths have been added.*

BREEDS AND BREEDING

The breeding projects have been carried on mainly in connection with three breeds, Yorkshire, Berkshire, Duroc-Jersey, but during the fall of 1924 a herd of Tamworths was established.

YORKSHIRES. The foundation stock for the Yorkshire herd was supplied by the Central Experimental Farm, Ottawa, and later additions were made from the herds of prominent western breeders. During recent years no females have been purchased but the herd has been replenished and improved by the "get" of high-class sires which have been purchased from the best herds in Scotland, Ontario, Manitoba, Saskatchewan and Alberta.

BERKSHIRES. The Berkshire herd was established in 1914, shortly after the Yorkshire, by purchasing a foundation from an Ontario breeder and later, in 1915, several head of sows were added from Alberta herds. For some years, up to 1921, the Berkshire herd was the largest of the three breeds maintained at this Station. The practice of improving the herd by buying only high-class sires has been followed with the Berkshires as with the Yorkshires.

The Berkshire is probably the most stylish and uniform in type and character of the three breeds, yet during recent years, with the development of bacon type in the Berkshire, it has lost much of the true breed character and uniformity in this respect. Fortunately there are a few breeders who have succeeded in a very fair measure in developing a bacon type of Berkshire hog and yet at the same time have retained the same true breed character that is so outstanding in the so-called old fashioned Berkshire.

DUROC-JERSEYS. In 1917 a foundation herd of Duroc-Jerseys was established for the purpose of supplying breeding stock to farmers and also for conducting breed comparisons and other feeding trials on a larger scale. All foundation stock was purchased from Alberta breeders. This herd was carried until the fall of 1923 at which time it had been well established that the Yorkshires and Berkshires, in the order named, made cheaper gains, and further that the demand for Duroc-Jerseys breeding stock had decreased to a point where it would not justify the maintenance of the herd for this purpose alone. The bone is coarser and the meat of a slightly coarser quality. Another point, of minor importance it is true but nevertheless one that has a bearing on the breed, is that in handling, driving, weighing, etc., the Duroc pig was proven at this station to be the most difficult to manage of the three breeds. The Duroc is a good grazer.

* The data used in this bulletin were collected and recorded under the direction of the first Superintendent, G. H. Hutton, up to the year 1919; since 1920 all work has been under the direction of the present Superintendent, F. H. Reed.

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TAMWORTH. During the past few years the Tamworths have become increasingly popular in Alberta. They satisfy the demand for a coloured bacon hog. In other words, owing to the slight tendency to sun-scalding in the Yorkshires, some farmers prefer the red hog, notwithstanding evidence of sun-scalding in this breed too. In addition to this, of course, the Tamworth breed has its supporters, and justly so. In view of these facts a Tamworth herd was established at this Station in the fall of 1924. Foundation stock was purchased from the Ontario Agricultural College, from breeders in Saskatchewan, and from several of the prominent and well-known herds in Alberta. This breed is being used in all feeding trials including comparisons with the Berkshires and Yorkshires.

SALE OF BREEDING STOCK TO FARMERS

Supplying choice pure-bred breeding stock to farmers at reasonable prices is one of the policies of the Dominion Experimental Farms. This has been carried out very effectively with hogs as well as with other classes of stock at this Station. Stock is for sale at all times of the year and at all ages so that the farmer of limited means who wishes to purchase one or more weaner pigs can do so, as can the purchaser who wishes gilts or boars of breeding age, or bred gilts. In a limited number of cases, mature sows are sold to meet the demands for this class of stock. One hundred and twelve head of breeding stock were sold to farmers in 1923, and in the year 1924, which was a year of reduction and retrenchment in the hog industry in Alberta, sixty-seven head of boars and gilts were sold for breeding stock; of this number sixty-one were pure-bred Yorkshires and the remaining six were Berkshires.

EXHIBITION WORK

Exhibition work in hogs has been done to a limited extent. Both in 1921 and 1922 breeding stock of the three breeds was exhibited at the Calgary and Edmonton Exhibitions and at the Red Deer Fair. The winnings included two championships; four reserve championships; seventeen firsts; fourteen seconds, and fifteen other prizes. Market hogs were exhibited at Calgary Winter Fair in 1922 and won reserve championship for bacon barrow; ten firsts, including carload-lot of bacon hogs; pen of three bacon hogs; and special for pen of five bacon hogs shown alive and in the carcass.

In the Alberta Bacon Breeders' Competition held at the University of Alberta in November 1924, a pair of pure-bred Yorkshire barrows from this Station stood twelfth on foot and first in the carcass in a class of thirty-eight pairs representing the four breeds, Yorkshires, Tamworths, Berkshires, and large Blacks. A pair of Berkshires from this herd stood thirteenth on the hoof and fifteenth on the rail in the same class, and were the highest-scoring Berkshires in the competition.

The foregoing brief account of the winnings at the leading exhibitions and fairs in the province shows that the type, character, and quality of the respective breeds maintained at this Station compare quite favourably with the herds belonging to private breeders and exhibitors.

CROSS-BREEDING

The cross-bred pig is usually thrifty and vigorous and an excellent feeder. The different breeds seem to cross better with some breeds than others from the standpoint of a good feeding commercial hog.

YORKSHIRE. The Yorkshire is desirable for crossing purposes as the resulting progeny of a Yorkshire boar mated with sows of another breed are invariably

white, and it is only occasionally that a spotted pig is produced from mating Yorkshire sows with boars of another breed. The type, in all cases, is remarkably uniform, which with the uniform colour adds considerably to the appearance and saleability of a group of market hogs. Experience at this Station has shown that the Yorkshire crosses well with either the Berkshire or Duroc-Jersey, with the Yorkshire-Berkshire cross preferred. The Yorkshire and Tamworth cross particularly well in regard to producing bacon hogs, as well as a good thrifty pig. The Yorkshire being an active hog escapes crippling in cold winter weather, and makes a splendid winter feeder, whether bred pure or crossed.

BERKSHIRE. The Berkshire crosses especially well with the Yorkshire, particularly when the Yorkshire boar is mated with the Berkshire sow, as already explained in the preceding paragraph. The Tamworth and Berkshire cross exceptionally well and in the opinion of some feeders make a better market hog than the Yorkshire-Berkshire cross.

DUROC-JERSEY. The Duroc, as already stated, crosses well with the Yorkshire and the best results seem to be obtained when Yorkshire sows are mated with the Duroc-Jersey boar, although the mothering qualities of the best type of Duroc can not be seriously questioned and therefore good results may be expected from the other cross. From the standpoint of bacon type the other crosses mentioned are to be preferred before the crosses involving the Duroc-Jersey.

TAMWORTH. This breed crosses particularly well with the Berkshire and Yorkshire and, naturally, from the standpoint of producing bacon hogs the latter cross gives the better results.

For additional results re cross-breeding see section on experimental feeding and feeding trials in comparing breeds and crosses, page 23.

PROLIFICACY OF THE DIFFERENT BREEDS AND CROSSES

The prolificacy of a breed of pigs is a very important point, directly affecting the profits of the breeding and feeding operations. A comparison of the different breeds and one cross are set forth in tables 1 and 2.

TABLE 1—COMPARISON OF PROLIFICACY DURING TWO FOUR-YEAR PERIODS

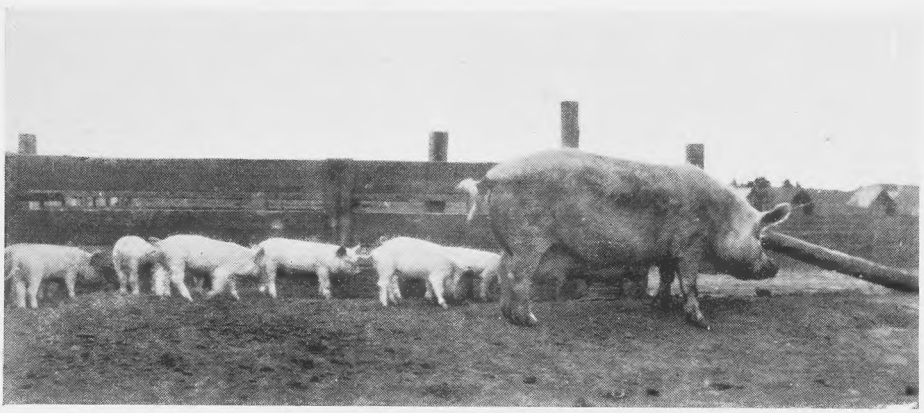
Breed	Average number of pigs per litter	
	Four years 1917–1920	Four years 1921–1923
Yorkshires	10·4	10·9
Duroc-Jerseys	8·7	8·8
Berkshires	8·6	8·4
Cross-breds (York-Berk, 6 litters farrowed in 1924)		10·8

During the eight-year period the Yorkshires have an appreciable lead over the other two breeds in size of litters. One Yorkshire sow farrowed an extremely large litter of twenty-five pigs, and this same sow farrowed six litters during a period of two years and six months, averaging seventeen pigs per litter, and raised a total of fifty-five pigs from the six litters. Her daughters are producing good litters of ten, twelve, and fourteen pigs and are good mothers. These unusually large litters, such as twenty-five pigs, are not desirable as the mortality must necessarily be high and possibly those that survive may suffer from lack of vitality, although this latter point has not been noticed in the progeny of this sow or in the offspring of her daughters.

TABLE 2—COMPARISON OF THE FARROWING RESULTS FROM THE DIFFERENT BREEDS, ALSO OF SPRING AND FALL LITTERS, FOR 1922-23-24-25

Year	Average number of pigs per spring litter					Average number of pigs per fall litter				
	York-shire	Berk-shire	Durco-Jersey	Tam-worth	Cross-breds	York-shire	Berk-shire	Duroc-Jersey	Tam-worth	Cross-breds
1922	11·3	7·1	10·2	.....	.....	11·7	9·0	7·6	.....	.....
1923	11·4	10·6	8·8	.....	.....	11·1	12·5	10·5	.....	.....
1924	11·09	10·6	.....	.....	8·5	10·0	7·7	.....	.....	12·0
1925	10·8	9·2	.....	6·9	10·0	9·7	7·5	.....	6·9	8·7
Total number of litters	71	51	27	15	6	42	17	16	6	11

The outstanding point in table 2 is the remarkable uniformity of the Yorkshire litters both from year to year and from spring to fall.



L.E.S. Delight 17, the Yorkshire sow bred at Lacombe Station which farrowed six litters within two-and-a-half years averaging 17 pigs per litter. The photo shows this sow and the sixth litter, of which she raised nine.

Twelve years of experience and observation with the Yorkshires at this Station shows them to be good mothers, in that they produce larger litters, are excellent milkers, and are just as docile as either the Berkshire or the Duroc-Jersey. The modern Berkshire produces litters of good size and vigour, although the prolificacy table previously referred to shows the Berkshire considerably behind the Yorkshire, which is partly accounted for by the fact that during the early years of the herd's history at this Station the more or less lard type of Berkshire was dominant in the herd.

The more extreme lard type and characteristics have been the undoing of the Duroc-Jersey since the bacon type of hog came into its own again following the close of the Great War with an attending discriminating demand for pork products of the bacon class. As a mother, the Duroc-Jersey sow compares favourably with the Berkshire, in fact, according to results at this Station, farrows slightly larger litters.

The Tamworths are good mothers, but from one year's trial, when all females were gilts except one, with their first litter they did not produce as large litters as either the Yorkshire, Berkshire, or cross-breds.

PRODUCTION OF HOGS DURING DIFFERENT PERIODS OF THE YEAR

Recently the question of whether or not fall pigs can be profitably raised has come up for a good deal of discussion. The importance of the continuity of a sufficient supply of pork products, mainly bacon in the form of Wiltshire sides to satisfy the demands of the export market for Canadian bacon, has also claimed much attention. With the object of endeavouring to arrive at a decision in these matters, in so far as the producer of hogs is concerned, the following tabulations have been compiled from results obtained at the Station.

Spring and Fall Litters

First, the question of spring and fall litters will be considered, which is dealt with in tables 3 and 4.

TABLE 3—A COMPARISON OF MARCH, APRIL AND MAY LITTERS

—		Eighteen March pigs	Eighteen April pigs	Eighteen May pigs	Averages
Age when put on test	days	53	49	51	51
Average daily gain per head	lb.	1·09	·98	1·02	1·03
Average finished weight	lb.	192·7	194·5	182·0	189·7
Meal required per 100 pound gain	lb.	309	365	293	322·3
Cost per 100 pound gain	$	4·37	5·11	4·31	4·60
Selling price per 100 pounds	$	9·50	6·75	6·25	7·50
Profit per head	$	8·46	1·86	2·01	4·11
Age when finished	days	206	223	207	212

In this experiment the April-farrowed litters were at a disadvantage because their pasture lasted only a short time and, therefore, they grew more slowly and less economically. The May-farrowed pigs had the best pasture and the best climatic conditions, but made slower, though more economical, gains. It will be noted that the March-farrowed pigs struck a much better market than either the April or May farrowings, which largely accounts for the greater profits. Another feature in favour of the early farrowings is that the sows can be bred to farrow fall litters not later than September 15. For March farrowing the farmer should have enough grain from the previous year's crop for finishing the pigs, as in all probability they will be ready for finishing before harvest.

Fall litters are to be encouraged, first, because two litters a year will bring larger yearly profits to the hog-raiser, and secondly, because it is highly important to furnish the hog-market with a continuous supply throughout the year both from a national viewpoint as well as from the standpoint of the farmer or hog-raiser. To the farmer who raises fall pigs the best date of farrowing means dollars and cents.

Table 4 gives the results obtained from a comparison of August, September, and October farrowings in an experiment conducted in 1923.

TABLE 4—A COMPARISON OF AUGUST, SEPTEMBER AND OCTOBER FARROWINGS

—		Twenty-five pigs farrowed August 20	Twenty-five pigs farrowed September 20	Twenty-five pigs farrowed October 1	Average
Average age when put on test Nov. 17	days	87	57	48	64
Average daily gain per head	lb.	0·97	0·85	0·88	0·90
Average finished weight	lb.	170	179	169·5	172·9
Meal required per 100 pounds gain	lb.	425	484	358	422·3
Cost per 100 pounds gain	$	5·22	6·70	5·72	5·88
Selling price per cwt	$	8·85	9·10	9·20	9·05
Profit per hog	$	5·91	3·60	5·18	4·90
Average age when marketed	days	220	222	231	224

The results of this experiment show that fall pigs can be raised at a profit These pigs were fed on a self-feeder and all were housed in a straw shed divided into three pens 16 feet by 14 feet each. The early farrowed lot had fewer losses and made the most profit per hog in spite of the fact that they were sold at a lower market than the other lots. The group farrowed August 20, consisted of eight pure-bred Yorkshires, six pure-bred Duroc-Jersey; five pure-bred Berkshires and six cross-breds (York-Duroc). The September 20 group was made up of nineteen York-Duroc cross-breds and six Berk-Duroc cross-breds, while the October 1 group were all pure-bred Yorkshires. In the light of all experiments in comparisons of breeds it would seem that the more economical gains made by the group farrowed in October were due to the fact that the pigs in this lot were all pure-bred Yorkshires. From experiments and observations at this Station it is considered that under average seasonal conditions fall pigs should not be farrowed later than September 15.

By comparing spring and fall-farrowed pigs in the light of experimental results given in tables 3 and 4 it will be shown that the spring pigs required 322.3 pounds of meal to produce 100 pounds of gain and were finished in 212 days at an average weight of 189.7 pounds per head . The fall pigs consumed 422.3 pounds of meal for every 100 pounds of pork produced and required 224 days to reach a finished average weight of 172.8 pounds per head. However, the 54 spring pigs show a profit of $4.11 per head while the 75 fall pigs show an average profit of $4.90 per head in spite of the more costly production, indicating that owing to better prices the fall pigs more than hold their own with the spring pigs. Further, in these experiments the March pigs and the August pigs made the greatest profit in their respective experiments showing that early litters, both spring and fall, strike the best market.

An Analysis of Five Different Farrowing Periods During the Year

The farrowing results are set forth in a comprehensive manner in the following tabulation which includes the years 1921-22-23-24-25 and a few litters farrowed in the winter of 1926. Each year is divided into five periods: January 1, to March 1, March 1 to June 1, June 1 to August 1, August 1 to October 1, and October 1 to December 31. The total and averages are given for the five periods for each year and also for the entire five-year period. January and February litters are included from 1926 because of the fact that there were no litters farrowed in these months in 1921, thus, by including these months in 1926 a complete five-year period is recorded. It is realized that many will not consider the farrowing of pigs in January and February practical for the farmer and for this reason another set of totals and averages is given in the following farrowing-summary respecting four periods only.

TABLE 5—FARROWING STATEMENT—ANALYSIS OF FARROWING RESULTS FOR DIFFERENT PERIODS DURING THE YEARS

Periods	1921					1922					1923					1924				
	No. litters farrowed	Av. no. pigs per litter	Total no. of pigs farrowed	Total no. of pigs weaned	% farrowed, weaned	No. litters farrowed	Av. no. pigs per litter	Total no. of pigs farrowed	Total no. of pigs weaned	% farrowed, weaned	No. litters farrowed	Av. no. pigs per litter	Total no. of pigs farrowed	Total no. of pigs weaned	% farrowed, weaned	No. litters farrowed	Av. no. pigs per litter	Total no. of pigs farrowed	Total no. of pigs weaned	% farrowed, weaned
(1) Jan. 1 to Mar. 1	.....	.....	.....	.....	.....	5	11·6	58	28	48·3	7	11·9	83	51	61·4	8	12·6	101	63	62·4
(2) Mar. 1 to June 1	32	8·6	275	143	52·0	41	9·0	371	244	65·8	26	9·6	249	158	63·4	16	10·1	162	107	66·0
(3) June 1 to Oct. 1	2	9·5	19	13	68·4	6	9·5	57	44	77·2	6	11·1	67	45	67·2	10	11·0	110	83	75·5
(4) Aug. 1 to Oct. 1	2	10·5	21	5	23·8	18	10·5	188	104	55·3	11	11·6	128	80	62·5	13	10·3	134	106	79·1
(5) Oct. 1 to Dec. 31	2	13·0	26	7	27·0	7	10·9	76	41	54·0	1	12·0	12	3	25·0	2	9·5	19	11	57·9
Total (five periods)	.....	.....	.....	.....	.....	77	9·7	750	461	61·5	51	10·6	539	337	62·5	49	10·7	526	370	70·3
Totals for 2, 3, 4 and 5 periods	38	10·4	341	168	49·2	72	9·6	692	433	62·5	44	10·4	456	286	62·7	41	10·4	425	307	72·2

Periods	1925					1926					Totals									
	No. litters farrowed	Av. no. pigs per litter	Total no. of pigs farrowed	Total no. of pigs weaned	% farrowed, weaned	No. litters farrowed	Av. no. pigs per litter	Total no. of pigs farrowed	Total no. of pigs weaned	% farrowed, weaned	No. litters farrowed	Av. no. per litter	Total no. of pigs farrowed	Total no. of pigs weaned	Av. no. per litter farrowed alive	Av. no. per litter weaned	% farrowed, weaned	Total no. farrowed dead (all years)	% farrowed dead	% farrowed alive, raised to weaning
(1) Jan. 1 to Mar. 1	7	14·0	98	34	34·7	9	10·0	91	75	82·4	36	12·0	431	251	11·3	7·00	58·2	25	5·8	61·8
(2) Mar. 1 to June 1	31	9·6	297	185	61·6	.....	.....	.....	.....	.....	146	9·2	1,354	835	8·5	5·7	61·7	115	8·5	67·4
(3) June 1 to Oct. 1	10	8·1	81	52	64·2	.....	.....	.....	.....	.....	34	9·8	334	237	9·3	7·0	71·0	18	5·4	75·0
(4) Aug. 1 to Oct. 1	13	8·4	109	85	78·0	.....	.....	.....	.....	.....	57	10·2	580	380	9·6	6·7	65·5	35	6·0	69·7
(5) Oct. 1 to Dec. 31	10	8·2	82	54	65·9	.....	.....	.....	.....	.....	22	9·8	215	125	9·4	5·7	58·1	9	4·2	61·2
Total (five periods)	71	9·4	667	408	61·2	9	10	91	75	82·4	295	9·81	2,914	1,828	9·2	6·2	62·7	202	6·93	67·4
Totals for 2, 3, 4 and 5 periods	64	8·9	569	374	65·7	.....	.....	.....	.....	.....	259	9·58	2,483	1,577	8·9	6·1	63·5	177	7·1	68·3

Digest of Table No. 5.—An analysis of table 5 shows that pigs are raised at this Station during all periods of the year, and that good-sized litters are farrowed at all times, naturally some periods being better than others, but the fact remains that with proper conditions pigs can be raised successfully during almost any month of the year. With abnormal winter conditions the losses are heavy, but under average winter conditions with housing accommodations as described elsewhere in this bulletin, young pigs can be raised economically, especially in view of the fact that, as a rule, both early spring and fall pigs strike a better market than pigs farrowed during the general farrowing period around April and May.

A closer analysis of the total of 295 litters farrowed during the five-year period shows the average litter to be 9.81 pigs; the average litter of living pigs, 9.2; the average litter at weaning age, 6.2 pigs; that 16 sows were required to produce approximately 100 pigs (99.2) at weaning age. During the five-year period, 6.93 per cent of the total farrowing, 2,914 pigs, were born dead, and 67.4 per cent of the pigs farrowed alive were raised to weaning age.

The first and third periods have the largest weaned litters, and the third period shows the highest percentage of weaned pigs. The highest percentage of still-births occurred during the March to June period, and the lowest percentage was recorded during the October 1 to December 31 farrowings; these periods also had the largest and smallest number of litters respectively, which would have some influence on the percentage results. Judging by the percentage of pigs weaned, the summary shows that the second, third, and fourth periods give the best results, while the number of pigs weaned per litter does not consistently favour the same periods. The mortality is lowest amongst June and July litters. The lowest number of still-births occurred amongst the October, November and December litters, but the percentage of pigs farrowed alive, raised, is also the lowest of the five periods given.

The following tabulation gives a final analysis of the total farrowing results and shows the order in which the different periods rank in respect to the important points:—

TABLE 6—SUMMARY OF FARROWING PERIODS

Farrowing Periods	Average number per litter farrowed	Average number per litter farrowed alive	Average number per litter weaned	Percentage of total farrowing weaned	Per cent of pigs farrowed alive weaned
January 1 to March 1	12·0	11·3	7·0	58·2	61·8
March 1 to June 1	9·2	8·5	5·7	61·7	67·4
June 1 to Aug. 1	9·8	9·3	7·0	71·0	75·0
Aug. 1 to Oct. 1	10·2	9·6	6·7	65·5	69·7
Oct. 1 to Dec. 31	9·8	9·4	5·7	58·1	61·2
	9·81	9·2	6·2	62·7	67·4

FEEDS AND FEEDING

Home-Grown Feeds

The main object of the feeder of all kinds of live stock should be to use home-grown feeds as far as possible consistent with satisfactory growth and development of the young stock. In Western Canada, where such good quality oats, hulless oats, and barley can be produced abundantly, these grains should form the basis of the grain rations. In addition to these grains, breeding stock should consume considerable quantities of roughages, such as alfalfa hay, roots,

or even oat green feed. The feeds just listed are all such as the Alberta farmer would have on hand every year. Skim-milk, too, should be mentioned as a very valuable hog feed particularly for weaner pigs and for sows during the suckling period. Unfortunately this is too frequently not available on western farms but dairying is being taken up to a greater extent each year and where skim-milk is available the farmer can produce his hog crop almost entirely on feeds produced on his own farm; and the "hog route" is a profitable way to market these feeds.

Purchased Feeds

Unfortunately the most of our home-grown feeds are low in protein and for the best results it is generally advisable to supplement the home-grown ration with such high-protein feeds as tankage, wheat bran and in some cases oilcake meal. Tankage can be used in the meal ration of hogs of all ages at the rate of from three to five per cent by weight, the object being, of course, to supply additional protein as well as minerals of animal origin. Wheat bran, an excellent feed for all classes of live stock, should be used in the ration of breeding stock or, in fact,, all classes, as this feed can usually be purchased reasonably in the West. Oilcake meal can be used to advantage in the ration of weaner pigs when skim-milk is not available, and as a matter of fact, experimental results at this Station show that a mixture of five per cent oil-meal and five per cent tankage makes a satisfactory substitute for skim-milk, as a protein supplement, in the ration of weaned pigs. Another feed that may be purchased with good results for the suckling sow and the weaned litter, is middlings; some flour mills produce a grade of shorts that make a satisfactory substitute for middlings. For the weaned pig, hulless oats, which the farmer can grow on his own farm makes a satisfactory feed when skim-milk, buttermilk or a mixture of tankage and oil-meal as protein supplement is provided. Where hulless oats are not available, common oat chop with the hulls sifted out makes a satisfactory substitute, the drawback to this being the amount of labour required to do the sifting.

The Herd Boar

Care and management should not be neglected if best results are to be obtained. The aim being to keep the boar thrifty and vigorous, but not fat. Plenty of exercise should be provided for at all times. In the summer the boar should be kept on pasture and fed a grain allowance if necessary to keep him in the proper condition. Some boars will probably be contented in a yard or pasture alone, while the more active boar will do better if a few sows are allowed to run with him; these, of course, being sows in the first stages of pregnancy or at least not in heat. Sows to be bred may be put in with the boar and removed after the first, or at most the second service, until the period of oestrum has passed. In winter the boar should be kept in quarters allowing for plenty of exercise. At this Station all boars are wintered in the open with well-banked portable cabins for sleeping-quarters. It, however, happens occasionally that if for one reason or another boars are not doing well they are placed in an inside pen until such time as they are normal and are again moved to the outside quarters. The winter ration for the boars is made up mostly of oat chop with possibly one-quarter each of wheat bran and barley, together with some alfalfa hay or oat green-feed, or both. If roots are available they are fed as well. Fresh water is provided daily, preferably with the chill taken off. Minerals, such as soft coal or possibly a cheap mineral mixture such as soft coal, lime, salt and sulphur, referred to in the section dealing with minerals under experimental feeding, are kept before the boars at all times.

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Feeding the Brood Sow

Winter feeding of brood sows is probably the keystone of the whole hog-raising enterprise, because the proper feeding and management of the pregnant sow influences to a very great extent the thrift and vigour of the litters, and of course the size, growth, and thrift of the litters determine success or failure. Experience at this Station has found the procedure for best results to be as follows. The sows are kept on a good pasture of rape or fall rye as late as possible before the winter sets in. The pasture is supplemented with grain in order to keep the sows in good condition and have them gaining or laying on weight, at the time they are bred. Use home-grown grains as far as possible, mainly oats fed either whole on a hard frozen surface or as oat chop scattered on the ground so that the sows will get additional exercise in picking up the grain. Surprisingly little chop will be wasted by feeding it in this manner while the ground is frozen. It is a good practice to feed about 1 pound of wheat bran per sow per day during pregnancy. If roots are available they may be used in limited quantities instead of bran, thus avoiding the outlay of cash for bran. For gilts which are carrying their first litter it is well to add 5 per cent tankage to the grain ration as an additional supply of protein which the young sows will require in order to nourish their litter properly in addition to continuing their own bodily growth and development. No barley should be fed to pregnant sows. Sheaf green feed will be relished by the sow; just throw a sheaf in the yard occasionally.

Watering. Fresh water should be provided for the sows daily, and preferably with the chill taken off. When the sow is nursing the litter, skim-milk is an excellent supplement to the grain ration.

Minerals. It is an excellent practice to keep fresh sods, slack coal, or a cheap mineral mixture, constantly available for the sows.

Potassium Iodide. In districts where hairlessness is prevalent the feeding of potassium iodide to pregnant sows during the gestation period is to be strongly recommended. Potassium iodide may be purchased from any druggist. One ounce dissolved in a gallon of water and one tablespoonful of solution fed to each sow per day is sufficient to prevent hairlessness. Even in herds where hairlessness does not occur it is considered that this allowance of iodide will have a beneficial effect on the general health of the herd.

Suckling Period. The feeding of the sow during the suckling period must of course be more liberal than at any other time in order to provide a good milk supply; taking it for granted that the brood sows have been selected from the standpoint of good milking ability. The first feed for the sow after farrowing should be a warm slop of middlings or shorts, preferably the former. Increase the ration gradually during the first ten days. A good meal mixture consisting mainly of home-grown grains for the sow can be made up of oat chop 500 pounds; middlings 75 pounds; and bran 50 pounds. It is the practice at this Station to feed the meal portion of the ration dry and at the same time in another trough, or in the opposite end of the same trough supply the milk, buttermilk, or water, whichever may be used as the liquid portion of the feed. This will allow the sow to mix her own slop thus relieving her of the necessity of consuming unnecessary quantities of water or milk, particularly during cold weather when the thirst is not as great as it is in hot weather. Both sow and litter should have ample space for exercise which will benefit the physical condition of the sow and prevent the young pigs from getting thumps, and also promote rapid growth and proper development. Roots and alfalfa should be provided in winter and early spring, and when pasture is available there is nothing better for both sow and litter. In winter some mineral material should be fed, such as fresh earth, slack coal, or wood ashes.

When the pigs are two weeks of age examine their mouths for long teeth, which may be black, and nip them off with a pair of pliers. Such action will prevent sore mouths in the pigs and sore teats on the sow.

Weaning-Time

Wean at from six to eight weeks of age. This is the critical period in the life of the young pig. The young pigs should be eating well, having been fed in a creep separate from the sow, before the dam is taken away. Skim-milk is probably the best feed for young pigs at weaning time; and with this can be fed a meal mixture of oat chop (with hulls sifted out, or hulless oats) 100 pounds; middlings 75 pounds; and bran 50 pounds. The newly weaned pigs should be fed at least three times per day for the first month after weaning. The main object at this time should be to keep the pig growing and prevent any setback. Good results can be obtained by feeding hulless oats or oat chop with the hulls removed, with skim-milk, buttermilk or oil-meal and tankage as a protein supplement. Provide space for exercise and plenty of green feed or pasture in the summer.

Developing Breeding Stock

Remarks under this head will deal with feeding practices following the weaning period, which at this Station is considered to extend from 30 to 45 days after the sow and litter have been actually separated. The feeding and developing of young breeding stock is one of the important phases of swine husbandry. Young breeding stock of both sexes should receive a ration that will promote growth of bone and muscle rather than fatten. Of our home-grown grains, oats fills the requirements in this respect the best. With the usual good quality western oats, adding about five per cent of tankage to increase the protein content, good growth can be secured. If oats are of average to poor quality it would be wise to include one-quarter barley as well as five per cent tankage. Should skim-milk or buttermilk be available it would not be necessary to purchase tankage. Such a meal ration, together with good pasture in the summer (see section on pastures) will produce good results. In winter, supply some sort of roughage, such as alfalfa, roots or even oat green feed in limited quantities. Should the farmer find himself in a position necessitating the purchase of mill-feeds to supplement his home-grown grains, or if he wishes to sell part of his home-grown and with the proceeds purchase mill-feeds, a good meal mixture can be prepared as follows: 2 parts oats, 1 part barley, 1 part shorts, ½ part wheat bran and 5 per cent tankage. Where boars have been carried along for sale as breeders, they will be sold around 5 or 6 months of age. The gilts will either be kept in the herd for brood sows or will be sold as bred gilts around 9 months of age, so that they should be kept in a good growing condition and in the late fall should be flushed on a good rape pasture in order that they will be in the best condition for breeding. After the freeze-up, plenty of roughage, such as roots, alfalfa, etc., as already mentioned, should be supplied, together with minerals in some form, as suggested for sows.

Feeding the Market Pig

The proper methods of feeding in order to produce a "select" finished pig have for some time claimed the attention of all those who are either directly or indirectly interested in hog production. Realizing that the type of hog is of first importance, it must be admitted that the feeding and feed mixtures used have a great influence on the type and quality of the finished carcass. Taking it for granted that the feeder sets out with a bunch of bacon-type pigs, the feeding of the market hog does not differ materially from the outline already

given in connection with weaners and the development of young stock up to the time that the pigs reach 4, 4½ to 5 months of age, depending on the growth produced during the periods prior to this age. After this time, of course, the question of putting on a proper finish is the important one. For this there is nothing better than good western barley, the amount of which may be gradually increased in the growing mixture until the entire meal ration is made up of barley unless there is a tendency for the hog to become over-finished before reaching at least 220 pounds in weight. If such is the case, the proportion of barley fed should be decreased according to the best judgment of the feeder. A proper finish is desirable in all grades of hogs whether they be select, thick-smooths, or heavies, but is highly important in the select class and ranks equal in importance to length and type in so far as the grading of the hog is concerned. A long underfinished hog will not be graded select, neither will a short well-finished hog. The two characteristics of a good bacon hog are sufficient, not necessarily extreme, length and a proper finish, together, of course, with smoothness and some other more minor details. In other words, breed carefully for the length and type and feed carefully for the proper finish.

EXPERIMENTAL FEEDING

Records covering eleven years work, from 1915 to 1925 inclusive, show many feeding experiments in connection with swine As an indication of the extent of these experiments it may be stated that the swine herd has totalled as high as 675 head in one year, exclusive of breeding stock, and the great majority of these hogs would be on a feeding trial of some kind. The personnel directing the work has changed from time to time during this period but the work has been carried on continuously and consistently. All data included in this publication have been compiled from the various annual reports issued during this period, and cover all phases of swine husbandry conducted at this Station. In fairness to the Station it should be added that during the period of the Great War the publication of detailed reports was necessarily considerably curtailed, particularly during the years 1917-19, consequently data in connection with a few projects are not complete in every detail during these years.

Self-Feeding vs. Trough-Feeding for Bacon Production

This subject is a much discussed one in these days of bacon hog production. Tables 7 and 8 give the result respecting cost of grain under both methods of feeding:—

TABLE 7—COMPARISON OF SELF-FEEDING, FULL HAND-FEEDING, AND THREE PER CENT HAND-FEEDING

—		Self-fed	Hand-fed (full feeding)	Hand-fed (3%)*
Av. daily gain	Lb.	1 52	1·36	1·30
Meal required per 100 lb. gain	"	404·4	347·0	383·0
Cost per 100 lb. gain	$	5·40	4·74	4·92

* Meal allowance was 3 per cent of the hog's weight.

The results given in table 7 are the average of five tests involving pure-bred Yorkshires and Berkshires and cross-bred Berkshire-Yorkshire hogs. The self-fed lots were fed on the common self-feeder; the hand-fed (full) lots were fed by hand and given all they would clean up twice per day; and the 3 per cent lots were fed a meal allowance equal to three per cent of the hog's weight

throughout the feeding period. The meal was fed dry and buttermilk or water supplied after the meal had been eaten. These results show that more rapid but more expensive gains are made on the self-feeder, while the full-fed hand-fed hogs made the most economical gains. It cost $0.66 more to produce 100 pounds of gain on the self-feeder than under full hand-feeding conditions, and $0.48 more per 100 pounds gain than on the 3 per cent ration. The self-fed hogs developed a shorter side and a fatter carcass. The hand-fed hogs ate more pasture than the self-fed lots, which undoubtedly accounts to some extent for the cheaper gains.

Another experiment in this connection was conducted during the winter of 1923-24 in which a comparison of breeds and methods of feeding shows additional results respecting the relative merits of self-feeding and hand-feeding, and also gives further data on comparisons of Yorkshires, Berkshires, Duroc-Jerseys and cross-breds:—

TABLE 8—SELF-FED AND HAND-FED HOGS

Breed	Average daily gain per head			Meal required for 100 lb. gain			Cost per 100 lbs. gain		
	Self-fed	Hand-fed	Av.	Self-fed	Hand-fed	Av.	Self-fed	Hand-fed	Av.
	lb.	lb.	lb.	lb.	lb.	lb.	$	$	$
Yorkshires	1·1	1·14	1·12	426·8	400·0	413·4	3·78	3·54	3·66
Cross-breds	1·07	0·91	0·99	500·0	483·8	491·8	4·44	4·29	4·36
Durocs	0·95	0·95	0·95	542·0	523·6	532·8	4·86	4·61	4·73
Berkshires	0·83	0·93	0·88	581·0	496·3	538·6	5·23	4·51	4·87
Average	0·99	0·98	0·985	512·4	475·9	494·1	4·58	4·24	4·40

The bottom row of figure gives the final results of the two methods of feeding, showing slightly greater daily gains, more feed required per 100 pounds of gain, resulting in more expensive gains in the self-fed lots. The labour expended in feeding is not taken into consideration in either case.

The third, sixth and ninth columns of figures in table 8 give the comparison of the different breeds and crosses showing that the Yorkshires made slightly greater daily gains on less feed than either of the other breeds or the cross-breds.

A more detailed analysis of the saving in "cost of gain" effected by hand-feeding shows that the 26 head of hogs involved in the hand-feeding experiment made a total gain during the feeding period, averaging 145 days, of 2,724 pounds, which at a saving in cost of gain of 34 cents per 100 pounds, meant a total saving of $9.25, or an allowance of approximately $6\frac{1}{2}$ cents per day for the extra labour required for hand-feeding. Respecting the labour requirements for the two methods of feeding, the difference is in feeding the meal only, i.e., in the case of the self-fed lots meal was put in the hoppers of the self-feeders in 400 pound and 500 pound lots, while in the hand-fed lots the meal must be supplied twice each day. The influence of self-feeding on the type of hog is important, and from results at this Station, previous to 1925, it is considered difficult, with the type of hogs we have at present, to produce "select" hogs by self-feeding.

Inside vs. Outside Feeding in Winter

This experiment throws some light on the question of housing hogs in winter. The lot fed inside were kept in the main piggery, and the lot fed outside were kept in the single-boarded winter-cabins, well banked with straw and with a canvas sheet hung over the door as a wind-break. The test began January 15, 1924.

TABLE 9—RESULT OF FEEDING TWO LOTS OF HOGS, ONE INSIDE AND THE OTHER OUTSIDE THE PIGGERY

		Lot fed inside	Lot fed outside
Average daily gain per head	lb.	1·07	1·33
Meal required to produce 100 lb. gain	"	485·5	400·0
Cost per 100 lb. gain	$	4·37	3·44

The results are decidedly in favour of outside feeding. The ration consisted mainly of oat chop and buttermilk and in computing the "meal required to produce 100 pounds gain" the buttermilk was included at the rate of 400 pounds of buttermilk being equal to 100 pounds of meal. While this is only one test, yet the result corroborates observations at this Station respecting winter feeding of hogs.

This illustration shows portable cabins, well banked with straw, used for wintering brood sows and herd boars. Feeding at a distance from the cabins forces the animals to take exercise.

Feeds for Weaned Pigs

The results given under this heading include tests conducted in 1915-16-21-22-23-24 and '25. The weaning period is the most critical one of the pig's life, and a setback at this time is seldom overcome; therefore it should be the object of the feeder to keep the pig growing all the time. Pigs used in these tests were weaned at eight weeks of age, and the lots were made up of from 5 to 10 head and were fed twice per day. An indication of the suitability of the different meals and mixtures for weaned pigs is shown in table 10.

TABLE 10—FEEDS FOR WEANED PIGS

—	Shorts and skim-milk	Oat chop and skim-milk	Barley and skim-milk	Oat chop and butter-milk	Shorts and butter-milk	Barley and butter-milk	Shorts and water	Oat chop and water
Average daily gain per pig.....	0·92	0·99	0·77	0·99	1·0	1·05	0·60	0·61
Pounds meal required per 100 pounds gain.....	168	170	171	170	166	169	255	296
Cost per 100 lb. gain..... ($)	3·66	3·66	5·40	3·64	3·86	4·51	4·27	3·32

—	Barley and water	Wheat and water	Shorts and whey	Oat chop and whey	Barley and whey	Shorts tankage and water	Oat chop tankage and water	Barley tankage and water
Average daily gain per pig.	0·42	0·373	0·99	0·95	0·85	0·80	0·77	0·70
Pounds meal required per 100 pounds gain.....	422	.....	175	182	208	218	226	251
Cost per 100 lb. gain..... ($)	7·60	3·21	3·34	3·14	4·69	3·29	3·0	4·73

Portable cabin well banked with straw to which fall, winter, and early spring litters are moved from the farrowing-pens. Note the canvas sheet which is dropped over the door. The door faces the south.

A summary of the lots in table 10, which were fed either oat chop, shorts or barley, is as follows:—

TABLE 11—SUMMARY OF TABLE 10

—		Oat chop	Shorts	Barley
Average daily gain per pig.....	lb.	0·80	0·80	0·76
Meal required to produce 100 lb. gain.....	"	209·0	196·0	245·0
Cost per 100 lb. gain.....	$	3·32	3·68	5·39

It will be noted, from table 11, that oat chop and shorts gave the most satisfactory gains, and while more oat chop was required to produce 100 pounds of gain, yet the cost was slightly less than was the case with the lots fed shorts. Another point in favour of oats is that they are home-grown.

A further summary of the same lots in table 10 gives the effect of the different protein supplements fed in the different lots:—

TABLE 12—SUMMARY OF RESULTS OBTAINED FROM THE DIFFERENT PROTEIN SUPPLEMENTS USED IN LOTS INCLUDED IN TABLE 10

—	Skim-milk	Buttermilk	Whey	Tankage	Water
Average daily gain per pig..... lb.	0·89	1·01	0·93	0·76	0·50
Pounds meal required to produce 100 lb. gain.....	169·6	168·3	188·3	232·7	324·3
Cost per 100 lb. gain..... $	4·24	4·00	3·72	3·67	4·60

In considering the results shown under tables 10, 11, and 12, it will be noted that of the common home-produced feeds used (oats, barley, skim-milk and buttermilk), oat chop and skim-milk and oat chop and buttermilk made satisfactory and economical gains. Under table 10 decidedly economical gains are shown in the lot fed oat chop, tankage, and water. In the summary under table 12, tankage makes the most economical gains. From these tables it would appear that if the farmer has either skim-milk or buttermilk and oats or barley he should make satisfactory gains in weaner pigs. If he has neither skim-milk nor buttermilk to use as a protein supplement it is good business to feed tankage at the rate of from 5 per cent to 10 per cent by weight of the meal ration. When no protein supplement is fed but only water is added to the grain ration, the gains are very slow and expensive. The weaner pigs become paunchy and often get a setback which lasts for weeks.

Effect of Oat Hulls on Growth of Pigs

This project was started in 1924. The experiment was conducted for 45 days immediately after weaning. The pigs were eight weeks of age and were fed in a dry lot. Ten head of pure-bred Yorkshire pigs were used in each lot, and the results are given in table 13.

TABLE 13.—RESULTS OBTAINED FROM A COMPARISON OF OAT CHOP AND OAT CHOP WITH HULLS REMOVED, ALSO A COMPARISON OF BUTTERMILK AND A MIXTURE OF OILMEAL AND TANKAGE

—	Buttermilk and oat chop	Buttermilk and oat chop, hulls removed	Tankage, 5 p.c., oilmeal, 5 p.c., oat chop	Tankage, 5 p.c., oilmeal, 5 p.c., oat chop with hulls removed
Average daily gain per head..... lb.	0·48	0·73	0·69	0·86
Meal required per 100 pounds gain..... "	668·0	439·0	370·0	328·0
Average gains made per head during—				
1st 15-day period..... "	8·1	9·8	7·6	9·0
2nd 15-day period..... "	5·7	10·5	11·2	13·4
3rd 15-day period..... "	8·5	13·5	13·1	17·1
4th 15-day period..... "	12·1	14·8	.....	.....

Note.—In this test the buttermilk fed is included in the "meal required per 100 pounds gain" on the basis of 400 pounds of buttermilk being equal to 100 pounds meal.

The results given in table 13 are from one year's work only, and therefore cannot be considered as final, but may be taken as an indication of the results that may be expected from the use of these feeds, especially in view of the findings from the experiment carried out in 1925 which is next discussed.

Oat Hulls, 1925 Test—Two uniform lots of hogs were selected—one lot was fed oat chop and the second lot was fed oat chop with the hulls removed. The same protein supplements were used in each lot and will not be considered in the calculations. Lot 1 was made up of nine pure-bred Tamworths and one pure-bred Yorkshire. Lot 2 consisted of ten pure-bred Tamworths. The weights, gains and amount of oat chop consumed respecting both lots are given in table 14.

TABLE 14.—DATA RESPECTING THE COMPARISON OF TWO LOTS OF HOGS, ONE FED OAT CHOP AND THE OTHER FED CHOP FROM WHICH THE HULLS HAD BEEN REMOVED

—		Lot 1 — Oat chop—hulls removed	Lot 2 — Oat chop
Date test commenced		June 18	June 18
Date test finished		Oct. 22	Oct. 22
Number of hogs in each lot		10	10
Average age of pigs at beginning of test	days	60	60
Average initial weight per pig	lb.	28·4	27·8
Average final weight per pig	"	190·6	147·3
Average gain per head	"	162·2	119·5
Number of days on test	days	127	127
Average daily gain per head	lb.	1·28	0·94
Feed required to produce 100 pounds of gain (oat chop)	lb.	266·5	484·2
Cost per 100 pounds of gain	$	3 96	5 70

Note.—The cost of gain under Lot 1 is based on the estimate that 20 per cent by weight of the oat chop was removed as hulls in the sifting process, therefore the feed requirement per 100 pounds of gain is increased by 20 per cent for the purpose of calculating the cost of amount of oat chop actually used.

It should be explained that at the conclusion of the test on October 22, lot 1 was finished and ready for market, whereas lot 2 had to be carried on a barley ration until December 3 to be finished. On this date the average weight of lot 2 was 175.4 pounds. From October 2 to December 3 these pigs consumed 2,665 pounds of barley chop and made a total gain of 281 pounds. The feed requirement was 948.4 pounds of barley per 100 pounds of gain for the last 281 pounds of gain made by the lot of ten hogs which had been fed oat chop from weaning, at an average age of 60 days, up to an average age of 187 days.

The amount of labour involved in the sifting of oat chop by hand prohibits the following of this practice where large numbers of hogs are fed unless some mechanical device can be used for this purpose. Hulless oats is the logical feed to use in the weaning ration where middlings or shorts are not available, but during the season of 1925, the hulless oat crop was practically a failure at this Station.

This test is quite in line with the results obtained in 1924 from the use of both oat chop with hulls removed and hulless oats as compared with straight oat chop. Results obtained to date seem to indicate that oat hulls as contained in oat chop are detrimental to young pigs during the weaning period and for the entire feeding period of the market hog when the oat ration is continued throughout the entire feeding period. It remains, however, for these results to be further confirmed, and also it remains to be proven as to whether or not oat chop, if fed alone *only* during the weaning period, after which it would be supplemented with barley, has the same effect as the chop in table 14.

Comparison of Common and Hulless Barley

Another test has been conducted with common and hulless barley to determine if the hulless would produce the more economical gains when used for finishing pigs on a self-feeder.

TABLE 15.—COMMON AND HULLESS BARLEY FOR FINISHING

—		Common barley	Hulless barley
Number of pigs in lot		10	10
Initial weight per head (average)	lb.	87·5	89·1
Weight at end of test (average)	"	134·3	143·8
Days on test (commencing Nov. 15, 1924)	days	54	54
Daily gain per head (average)	lb.	0·86	1·01
Meal consumed per head per day (average)	"	5·91	5·94
Meal required to produce 100 pounds gain	"	619·00	533·00
Cost per 100 pounds gain	$	8 64	7 44
Meal consumed per head during feeding period—			
Barley	lb.	226·1	.....
Hulless barley	"	.....	227·3
Oats	"	63·6	64·4
Cost of grain based on—			
Oats at 40 cents per bushel.			
Barley at 70 cents per bushel of 48 pounds.			

This test was continued through stormy and extremely cold weather until the supply of hulless barley was exhausted. In spite of the good gains that have been had with feeding out-of-doors during average winter weather, it will be noted that these pigs made slow and expensive gains, supposedly largely due to the extreme weather conditions.

At the conclusion of the 54-day feeding period, these lots were put in pens indoors for finishing, where they made almost phenomenal gains, going as high as 3 pounds per day per head for a period of one week. As before stated, the hulless barley was all fed out at the end of the 54-day period, and the pigs were finished on common barley.

An other test comparing barley and hulless barley was conducted in the fall of 1925, beginning November 18 and concluding December 13. Five pure-bred Yorkshire barrows were used in each lot and the results are shown in table 16.

TABLE 16.—BARLEY AND HULLESS BARLEY

—		Lot 1 — Barley	Lot 2 — Hulless barley
Number of pigs in lot		5	5
Initial weight per head (average)	lb.	100	119
Weight at end of test	"	138·8	157·8
Days of test (commencing November 18)	days	44	44
Daily gains per head (average)	lb.	0·90	0·90
Meal consumed per head per day—			
Barley	"	5·53	.....
Hulless barley	"	.....	6·00
Oat chop	total lb.	.....	140
Meal required to produce 100 pounds gain	lb.	627·0	752·6
Cost per 100 pounds gain	$	6·27	9 23

Cost of gain based on:—

Barley at 48 cents per bushel or 1 cent per pound.
Hulless barley at 70 cents per bushel or 1¼ cents per pound.
Oats at 34 cents per bushel or 1 cent per pound.

CHEMICAL ANALYSES OF THE BARLEY AND HULLESS BARLEY

—	Moisture	Protein	Fat	Carbo-hyd's	Fibre	Ash
Barley	13·71	10·18	2·94	63·42	5·41	2·33
Hulless barley	15·55	14·45	3·21	61·85	3·17	1·77

An analysis of these results will show a very unusual occurrence in that the daily gain and total gains were exactly the same in both lots. The costs of gains are decidedly against the hulless barley, which is not consistent with results obtained during the winter of 1924-25 on the same feeds. For some reason the hulless barley was not palatable, and it was necessary to add 20 per cent of oat chop at the beginning of the feeding period. The feeding of oat chop was continued for 18 days, after which time the pigs ate the hulless barley satisfactorily. The hulless barley had a slightly laxative effect on the hogs, accounting to some extent for the expensive gains.

Both lots were fed out-of-doors in adjoining lots with well-banked portable cabins for sleeping-quarters. Small runs 12 feet by 24 feet adjoined each cabin, providing space for limited exercise and for the feed trough.

Value of Frosted Wheat as Hog Feed

In 1915 three tests were conducted to determine the value of frozen wheat for hog feed. The following results were obtained:—

TABLE 17.—FROSTED WHEAT

—		Frosted wheat and water	Oats, barley and skim-milk
Average daily gain per head	lb.	1·37	1·00
Cost per 100 pounds of gain	$	3 26	6 51

In a second trial the cost per 100 pounds of gain for frozen wheat was $5.14. With pork worth six cents per pound, gains in live weight on the above basis would give frosted wheat a value of $1.33 per 100 pounds, or approximately 80 cents per bushel.

Another trial with two lots of five hogs, one fed well-ground frozen wheat and water and the other lot fed one part oats and two parts barley well ground, gave the following results:—

TABLE 18.—FROSTED WHEAT VS. OATS AND BARLEY

—		Frozen wheat	Oats and barley
Average daily gain per head	lb.	1·83	1·62
Cost per 100 pounds gain	$	4 12	4 82

It will be noted that frozen wheat proved superior to oats and barley in these tests.

Minerals in the Ration

The value of minerals in the hog's ration has been a very important question during recent years and is being investigated by practically all prominent

experimental stations in both Canada and the United States. Experiments in this connection have so far been quite limited at this Station. Table 19 gives the results of one trial.

TABLE 19.—RESULTS OF ONE YEAR'S WORK WITH MINERALS IN FEEDING HOGS

—		Pasture	Fed indoors with minerals	Fed indoors without minerals
Average daily gain	lb.	1·34	1·33	1·23
Meal required to produce 100 pounds gain	"	286·0	289·0	309·0
Cost per 100 pounds gain	$	4 05	4 38	4 38

These results indicate that pasture is just as valuable as minerals from a nutritional point of view and also from the standpoint of economy of gains. The lot fed minerals made slightly greater gains than the lot not receiving minerals, although the cost of the minerals offset the increase in gains, making the cost per 100 pounds gain the same for both inside lots. The mineral-fed hogs had more growth and stronger bone than the no-mineral lot, and four of the five hogs in the lot graded "select". In the no-mineral lot a finer bone was noticeable and the pigs lacked the growth and stretch of the mineral-fed group, being 11 pounds per head lighter at the end of the feeding period. Three of the five hogs in the no-mineral group graded "select". Where pasture is not available, this experiment would indicate that it is advisable to feed minerals on account of the resulting extra growth and length producing a better type of market hog. Table 20 shows the comparative gains made by lots fed grain alone and grain with minerals.

TABLE 20.—GRAIN FED ALONE AND WITH MINERALS

—		Lot 1 — Grain alone	Lot 2 — Grain and minerals
Number of pigs in lot		8	10
Days on test (commencing January 12, 1925)	days	95	95
Initial average weight per head	lb.	66·8	64·3
Final weight per head	"	165·0	174·0
Gain per head	"	98·2	109·7
Gain per head per day	"	1·03	1·15
Feed required per one pound of gain	"	5·14	3·35
Feed consumed during period on test—			
Barley	"	2,365·0	1,956·0
Oats	"	1,059·0	1,095·0
Wheat	"	618·0	628·0

It will be noted that the hogs in this test receiving minerals made 11.5 pounds greater gain per head during the feeding period of 95 days. The amount of meal required to produce 100 pounds of gain is decidedly in favour of the mineral-fed group. Both lots were self-fed out-of-doors with well-banked portable cabins for shelter. Two pigs in the non-mineral group died during the course of the experiment.

In these experiments a mixture of tankage and edible bone meal in equal parts was kept constantly available to the hogs receiving minerals. They also had access to a mineral mixture made up of: soft coal, 185 pounds; salt, 8 pounds; lime, 5 pounds; sulphur, 2 pounds.

The pigs used were Yorkshires, Berkshires, and Tamworths, with some Yorkshire-Berkshire and Yorkshire-Tamworth cross-breds.

COMPARISON OF BREEDS AND CROSSES IN FEEDING TESTS

The comparison of breeds and the different crosses has been one of the several lines of experimental feeding conducted. Yorkshires and Berkshires have been bred at this Station during the entire ten-year period, but the herd of Duroc-Jerseys was not purchased until 1917 and they were disposed of in the fall of 1923, so that comparisons between these three breeds will involve experiments conducted over a seven-year period. Summaries for two periods show the comparative gains made by the three breeds.

TABLE 21—SIX YEARS' COMPARISON OF YORKSHIRES, BERKSHIRES, AND DUROC-JERSEYS IN THE FEED-LOT

Breed	Pounds of grain required to produce 100 lb. of gain	
	Four-year period 1917-18-19-20	Two-year period 1922-23
	lb.	lb.
Yorkshire	515·3	310·0
Berkshire	514·8	336·0
Duroc-Jersey	570·6	340·0

It will be noted that there is considerable difference in the meal requirements per 100 pounds of gain between the two periods referred to in table 35 but that the comparative requirements for the different breeds remains fairly constant, showing that the Yorkshires require slightly less meal to produce 100 pounds of pork than either of the other two breeds. The Berkshires also have a somewhat greater lead over the Duroc-Jerseys. The results in table 21 include data from feeding trials conducted in both winter and summer, with and without pasture. In other words it is an average of all feeding trials in breed comparisons conducted during the seven-year period. In 1922 and 1923 the type of the finished hogs in the lots representing the different breeds was decidedly in favour of the Yorkshires from the standpoint of market requirements and bacon production.

Cross-breeding work with hogs has been carried on during the past few years. The following table will give the results from point of view of economy of gains on two years' work:

TABLE 22—COMPARISON OF CROSS-BRED HOGS IN FEEDING TRIALS.

Cross	Meal required to produce 100 lb. gain
	lb.
York-Duroc	380
Berk-Duroc	410
York-Berk	510

It will be noted that the York-Duroc (Yorkshire boar and Duroc-Jersey sow) cross-bred hogs made the most economical gains, and were a good type of market hogs, showing the Duroc to good advantage as a hog for crossing purposes. (See also table 8 for additional data re comparison of breeds.)

Summary of Comparisons of the Three Breeds

In drawing conclusions respecting the merits of the different breeds, two main points are considered, viz. "pounds of grain required to produce 100 pounds of pork" and "prolificacy"; and of course coupled with these points

are our observations respecting the type of market hogs produced by the different breeds, the mothering qualities of the sows, and the demand for breeding stock. Table 21 shows that from the standpoint of economy of gains the three breeds rank in the following order: Yorkshire, Berkshire, and Duroc-Jersey. In table 22 the Duroc-Jersey shows up to good advantage in cross-breeding as both the York-Duroc cross and the Berk-Duroc cross gave more economical gains than did the York-Berk cross. Comparing the prolificacy of the three breeds, table 1 shows that the Yorkshires have a decided lead over the other two breeds which are practically equal, the slight difference being in favour of the Duroc-Jersey. The cross-bred litters in this table compare favourably with the pure-breds. Considering the three breeds from the market-hog point of view, the Yorkshire unquestionably leads the other breeds in the production of bacon hogs; the Berkshires have a slight margin over the Duroc-Jerseys in that a small percentage will grade "select"; whereas up to the time the Duroc-Jersey herd was sold, not one Duroc-Jersey hog had graded "select". During recent years the demand for breeding stock has been decidedly in favour of the Yorkshire, with a limited demand for Berkshires and a continually decreasing demand for Duroc-Jerseys. Their good mothering qualities and ease of handling and managing has helped to force the decision in favour of the Yorkshires.

The preceding paragraph shows that the Yorkshires lead on all counts by a decided margin, with the Berkshires and Durocs in closer competition, but in practically every feeding trial the Berkshires show a lead over the Duroc-Jerseys; so that when it was decided to dispose of one of the three breeds at the Lacombe Station in the fall of 1923, there was no hesitation in eliminating the Duroc-Jerseys from the herd. The proportion of Berkshires was decreased for the same reasons.

Only one year's results are available at this time respecting the comparison of the Tamworths with the Yorkshire, Berkshire, and the various crosses and in view of the fact that the results of one test is not conclusive evidence either for or against, no data including the Tamworths will be included in this bulletin. It may be stated, however, that in one trial involving 28 head of Yorkshires, 10 Tamworth, 10 Berkshires and 9 Berkshire-Tamworth cross-breds, the Tamworths made slightly the most economical gains. It will be necessary to conduct many more trials in order to record definite conclusions as to the merits of the Tamworth as compared with the other breeds.

PASTURES AND PASTURE CROPS FOR HOGS

Pasture crops constitute an important source of nutriment for the growing and maintenance of breeding stock, and if used judiciously can be utilized profitably in the early stages of the development of the market pig.

In order to give complete information, as recorded at this Station, respecting the results obtained from different pasture crops under the different yearly seasonal conditions extracts from five consecutive annual reports will be given. Table 23 gives experimental data recorded in the 1916 annual report, which would be from results obtained from pasturing during the season of 1915.

TABLE 23 -SHOWING GAINS MADE BY HOGS ON DIFFERENT PASTURES

——	Wheat, oats and barley	Alfalfa	Rape	Oats	Barley	Wheat	Dry lot
Av. daily gain per head lb.	0·808	0·808	0·778	0·795	0·762	0·661	0·501
Cost per 100 lb. gain.. $	3·50	3·40	3·45	3·41	3·51	4·00	5·30

From an experiment conducted in 1916 to determine the relative value of barley, wheat, sweet clover, rape and alfalfa, the alfalfa and rape produced the most economical gains and carried 1,518.9 pounds and 1,786.1 pounds of hogs per acre respectively.

In 1917 experiments were conducted to determine both the stock-carrying capacity of various pastures, and the pounds of grain required for a pound of pork gain with the different pastures. The results indicate the best commercial pastures to be alfalfa and rape, the former for use early in the season and the latter for late summer and fall. Of those tested, the best single pasture was rape. It required 4.34 pounds of grain to make one pound of pork on the self-feeder with rape pasture and 6.16 pounds of grain to make a pound of pork on the self-feeder without pasture of any kind. An acre of rape pasture effected an economy of 2,453 pounds of grain.

The general pasture experiments carried on with hogs in 1918 failed to show the usual advantages of using pasture, no doubt due to the poor growth of forage crops as a result of the dry season. Oats and barley, of the cereals, again took premier place and are to be recommended for districts where this class of pasture is used. From results obtained it can safely be said that rape is bound to continue as one of the standard pastures for hogs.

It was shown from tests conducted in 1919 that oats carried fully 1,000 pounds more pork per acre than barley, and rape sown broadcast and in drills gave excellent results. The hogs pastured on hardy Grimm alfalfa were thrifty, developed good bone, and finished off at a good weight for market, while the cost of producing pork on sweet clover was very high. For early pasture a small area of fall rye may be found useful. With the exception of the sweet clover pasture, the cost of pork production was highest when hogs were fed in a small corral.

Various Pastures Used

Alfalfa Best—Alfalfa, where it can be grown, is undoubtedly the best pasture for hogs. It has the greatest food value and the hogs prefer it. It is, in some seasons, difficult to obtain a good stand, and it is not a good annual pasture. Alfalfa gives better results when seeded in drills 30 inches apart at the rate of 3 to 4 pounds per acre. By seeding in drills an opportunity is given to control weeds, which is more important with alfalfa than with rape, as the former covers at least two seasons. If seeding can be done in the early spring the growth will be sufficient for pasture that same fall. It should not be pastured too severely, as this would lessen its chance to carry through the winter. If, on the other hand, it is not required for fall pasture, the land can be summer-fallowed in the early part of the season, and the alfalfa seeded before the 15th of August. If a good healthy stand is obtained, the alfalfa will stand pasturing throughout the second summer. It is not advisable to continue longer than two seasons because of the weed growth.

Oats and Fall Rye Mixture.—For central Alberta the rye-and-oat pasture is proving to be the most reliable year-in and year-out pasture. Two bushels of oats mixed with one bushel of fall rye, spring-seeded, has proven the most satisfactory, and particularly during dry seasons. The rate of seeding should vary from 3 to 4 bushels per acre, with the lighter seeding in dry years. Fall seeding of rye is not recommended because it is liable to winter-kill, but where it does come through the winter it gives a rapid growth early in the spring before the spring litters are old enough to keep it eaten off. It heads out early and, once in this stage, the hogs eat very little of it. Three lots fall-seeded at this Station headed out and had to be cut with the mower toward the end of July, and there was very little growth afterwards. By the middle of August these pastures were dead because there were not enough hogs to keep them eaten back in the spring. Fall rye and oats can be seeded as soon as the ground is ready, and will give a

good healthy growth early enough for the pigs. The oats grow the more quickly and can be pastured when about 6 inches high. By the time the oats are eaten off, the rye will have formed a good, vigorous mat which, if not pastured too heavily, will give pasture until after freeze-up in November. In the past dry summer, the best pastures were seeded early in June or about ten days before the first good rain on June 19. The pasture seeded at this time gave the best growth late into the fall. Rye without oats is practically as good, but takes longer to get a start.

Rape.—Rape takes second place as an annual pasture for hogs. Seeding at the rate of 3 to 4 pounds per acre in rows 30 inches apart is most satisfactory, as it gives an opportunity for controlling weeds and the hogs do not tramp it down as they do when it is seeded broadcast. Rape gives a heavy growth per acre, but is supposed to be objectionable from the standpoint of palatability. This objection has not been recorded at this Station. Hogs were turned in when it was 8 inches or 10 inches high, and they took to it at once and with relish. The rape never got beyond the hogs, and it gave a good pasture until late fall.

On August 28, 1925, eight sows were placed on a rape pasture for flushing before breeding for early winter litters. No grain was fed during the twenty-seven days these sows were on this pasture and they made an average gain of 34.6 pounds per head during this period, or a daily gain of 1.28 pounds per head. The rape in this test was sown broadcast and had reached a height ranging from eight to ten inches before the sows were turned in the pasture lot.

It is as a late fall pasture that rape has its special advantage. From observation it is believed that rape is conducive to sunscalding in young pigs when moisture is on the leaves if they are allowed to pasture on it under such conditions.

Oats, Fall Rye and Alfalfa.—A mixture of fall rye (one bushel); oats (two bushels) and fifteen pounds of alfalfa per acre seeded in the spring has given good results at this Station as a hog pasture. On June 23, thirteen Tamworth sows were placed on a pasture of this kind, (the oats had reached a height of about six inches) for a period of twenty-three days and made an average gain of one pound per day per sow on the pasture alone. No grain was fed.

Sweet Clover.—Sweet clover is handled in a similar manner to alfalfa, and is best when seeded in drills at the rate of 3 to 4 pounds per acre. Sweet clover gives a ranker growth than alfalfa, and will stand more severe pasturing. On the other hand, it is not as palatable and not relished by hogs. If it gets beyond a foot high, they do not care for it and dig up the roots rather than eat the portion above the surface.

Oats, Barley and Wheat.—These crops are sometimes used for pasture, and rank in the order given as pasture crops. Oats are palatable, give a good growth and stand more pasturing than barley or wheat. Barley grows early to start with, but is not as palatable as oats and kills out more easily, being a shallower-rooted plant. Wheat grows slowly, is not as palatable as oats, and is more expensive to seed.

Hogs Make Cheapest Gains on Pastures

In one test, conducted in 1923, comparing pastured hogs with hogs fed inside, the pastured hogs made the greatest and cheapest gains. While they gained very little more than the hogs fed indoors with minerals, their gains were 0.33 cents a pound cheaper. In the finish of the different lots of hogs, the pasture-fed hogs were quite different from the pen-fed hogs. They were bigger, rangier, with a great deal more stretch and bone. They did not appear as smooth or as finished as the other two lots. They, however, were finished hogs, and the four Yorkshires graded select bacon. For growing bacon hogs in summer this experiment has demonstrated the value of pasture both for economy of gain and for the development of the correct type of hog. Where pasture is not available it is

advisable to feed minerals to develop growth of bone. The hogs fed on pasture would have carried a better finish, and would have made cheaper gains had they been penned up for at least two weeks before they were turned off.

The point of giving hogs a proper finish before marketing cannot be too strongly emphasized and except in cases where there is a danger of over fattening, hogs should be taken off pasture from a month to two weeks, depending upon the condition, before marketing and placed in an inside pen or in a yard with limited space for exercise where they can be finished carefully and properly.

Palatability of Pasture is Important

The palatability of pastures is largely influential in securing the gains and should be considered when deciding the kind of pasture to use. In one test where peas, alfalfa, rape and a mixture of fall rye and oats were seeded in strips side by side, the hogs selected peas as the first crop to be eaten when they had free access to all; then the oat and rye pasture was cleaned up, along with the alfalfa (owing to the dry season the alfalfa did not germinate well), and the rape was the last crop to be eaten; which indicates that rape was the least palatable of the crops in this test. It should be remembered, however, that when peas are once eaten off they will supply little or no further pasture, whereas the oat-and-rye mixture, the alfalfa, and the rape will supply pasture continuously, if not cropped too heavily. As stated previously, rape seems to have its particular value in late fall pasture for hogs, and especially for flushing sows before early fall breeding and before going into winter quarters.

Rates of Seeding for Pasture Crops

The rates of seeding of the different crops used in this test were as follows:—

Peas.....2 bushels per acre.
Oats and rye.....2 bush. oats, 1 bush. fall rye per acre.
Alfalfa.....15 pounds per acre, broadcast.
Rape.....6 pounds per acre (broadcast) or 4 pounds per acre in rows (seeding in rows is preferable).

COST STUDIES

TABLE 24—COST OF RAISING AND MAINTAINING SOWS

	$ cts.
Five months on pasture at 50c. per sow per month*	15 00
Seven months of grain, total consumed, 5,600 lb. at 1 cent per lb	56 00
1,200 lb. skim-milk per sow at 20c. per 100 lb	14 40
Total	85 40
Average cost per sow	14 23
*Based on records from one Berkshire and five Yorkshires.	
In 1916 the average cost for carrying four Berkshires and two Yorkshires for one year was:—	
Four months pasture at 50c. per sow per month	12 00
Twelve months on grain, total consumed 10,266 lb. at 1 cent per lb	102 66
1,025 lb. skim-milk per sow at 20c. per 100 lb	12 30
Total	126 96
Average cost per sow	21 16
In 1917 the average cost of carrying sows for one year was	20 90
Three year average per head	18 76
During the winter of 1919-20 sixty Berkshire, Yorkshire and Duroc-Jersey brood sows were carried from November 15 to March 16, at a cost of $3.90 per month.	
Data collected in 1915 show the cost of raising ten Berkshire gilts from farrowing until approximately one year of age to be as follows:—	
Four months pasture at 50c. per gilt per month	20 00
Ten months grain, total consumed 15,430 lb. at 1 cent per lb	154 30
23,650 lb. skim-milk at 20c. per 100 lb	47 30
Total	221 60
Average cost per gilt	22 16

The cost of pigs at weaning time, estimating six pigs per litter, was $3.48 for aged sows and $2.99 for gilts with their first litter, on a basis of only one litter a year.

Cost of Pork Production

The cost of pork production is, in the final analysis, the deciding factor as to whether or not the breeder and feeder stays in the business. Figures from twenty-five experimental lots of hogs carried through to market weights show the average meal requirement and cost of gain to be as follows:—

Meal required to produce 100 lb. gain	lb.	408
Cost to produce 100 lb. gain	$	4 25

Data involving nineteen experimental lots respecting the meal requirement and cost of gain in pigs during a period from thirty to forty-five days after weaning show the following figures:—

Meal required to produce 100 lb. gain	lb.	264
Cost to produce 100 lb. gain	$	3 92

In this tabulation the milk and protein supplements are not calculated in the " meal requirement " but are included in the " cost of gain ".

Average daily gains made by hogs during 30-day periods from one month to four months of age. Data based on gains made by fifty head of hogs:—

	lb.
Daily gain for first 30-day period	0·570
" " second 30-day period	0·8118
" " third 30-day period	0·8718
" " fourth 30-day period	1·704

HOUSING

Expensive and elaborate houses for swine are unnecessary. Portable cabins can be used for swine of all ages in both summer and winter, excepting sows farrowing in winter, providing they are well banked with straw and have the door on the south side protected from the wind with a sheet of sacking or similar material. Such cabins are cheaply constructed and can be moved readily from place to place; a very important consideration in connection with swine sanitation, particularly with reference to the control of worms. Sheds built of straw and poles, or straw, posts and discarded woven wire fencing, make ideal quarters for wintering brood sows or for winter housing of all pigs. Reasonably warm, dry quarters, free from draughts must be supplied for the farrowing sow. In fact all hog-houses should be dry and especially free from draughts.

How portable cabins are lined up and banked for housing pigs in winter in connection with outside experimental feeding trials.

Housing the Brood Sow

At this Station a straw shed is used for winter quarters for brood sows. This shed is built of posts set in the ground (see illustrations), discarded wire fencing forming the inside and outside wall, and the space between (two feet) is filled with straw. It is 48 feet long, 18 feet wide, 4 feet at the eaves and 7 feet high

Photograph showing the setting of the posts which form the framework of the straw shed for brood sows.

at the ridge-pole, and will accommodate from fifty to sixty head of sows. The location of this shed is about 150 yards from the feeding-yard, which is situated near the main piggery, and the sows are forced to walk over freshly fall-ploughed land to and from the yard for feed, thus forcing exercise. About ten days or

Straw shed partially completed.

two weeks before the sow is due to farrow she should be brought inside to warmer and more comfortable quarters. If worms are in the herd, treatment should be as described in the next chapter. If no regular farrowing-pen is available for early litters, a stall in the horse- or cow-stable will answer the purpose. The

farrowing-pen should be dry and free from draughts and reasonably warm. In this connection it is surprising what excellent results are frequently had where sows farrow in the straw stack. However, a suitable farrowing-pen is to be recommended, and it should have a rail around the wall about eight inches from the floor and projecting eight inches from the wall to prevent the sow from crushing the young pigs against the wall. At this Station, as soon as the youngsters are from ten days to two weeks old, if the weather is not too severe, the sow and litter are moved outside to a cabin that is well banked with straw, as shown in an illustration. These cabins have been a decidedly successful method of housing early litters at the Lacombe Station.

Straw shed completed. It was found necessary to fill in one of the doors in order to avoid drafts.

Housing the Herd Boar

The well-banked, portable cabin with plenty of space for exercise has proved to be satisfactory for housing the boar in winter, and in summer these cabins, without the straw banking, have been an unqualified success.

Housing the Young Stock

The portable cabin as housing accommodation for young stock, whether feeders or breeding stock, cannot be improved upon either from the point of view of economy, the health of the stock, or satisfactory general management. These houses can have a portion of the roof hinged so that they can be opened, thus allowing the sun, with its great disinfecting power, access to the inside of the cabin.

SANITATION

It is not an uncommon belief that the hog is the most unsanitary of our farm animals. As a matter of fact, if given a fair chance, the hog will keep exceptionally clean. It is true that during hot weather pigs will wallow in puddles or sloughs if the opportunity presents itself, yet this habit is for the cooling effect and not from a desire to become unclean. Given a clean bed raised a few inches above the floor-level of the hut, the pig will, with few exceptions, keep clean sleeping-quarters.

Under the head of sanitation may be considered the matter of keeping the pig healthy both within and without, which involves many conditions that the domesticated hog cannot effectively control.

Worms. Worms in hogs have not been common in Alberta but now owners and managers of large herds are observing serious losses developing through the attacks of the common white-worm, or round-worm, or Ascarid; losses not necessarily due to deaths, but to coughs, thumps, etc., that are mainly attributable to the attacks of this parasite and which result in runts and unthrifty pigs. Unless definite sanitary measures are adopted for the prevention and control of round-worms in large herds, serious losses will result. Successful treatment for worms consists in prevention rather than cure, and the main feature in prevention is strict sanitation. The farrowing-pen, if hogs have previously occupied it, should be thoroughly cleaned with a strong disinfectant applied hot, or by using boiling water and lye (1 pound of lye to 40 gallons of water). This will destroy any worm eggs that may be in the pen. The sow should be treated with oil of Chenopodium to rid her of any adult worms, which produce the eggs, that may be in her digestive tract. Oil of Chenopodium may be administered by placing one tablespoonful in the feed about three weeks before farrowing. If, owing to its unpalatableness, the sows will not take it in the feed, the capsule and balling-gun will insure successful administration if handled carefully. A purgative of epsom or glauber salts should be given the day following the ingestion of drug. Next, wash the sow's udder carefully before she is put in the farrowing-pen, so that no worm eggs will remain attached to the teats or udder to be taken by the young pigs into their digestive tract, hence to the lungs, which are respectively the starting point and seat of the trouble. When the sow and litter are removed from the farrowing-pen they should be taken to a fresh, clean pasture plot, if in the spring or early fall. With late fall, winter and early spring litters, the next step from the farrowing-pen is to fresh uncontaminated soil, on which hogs have not run for at least one year, and to clean shelters. If the young pigs can be kept from getting the worm eggs until they are from three to four months of age, they will then be beyond the critical stage. Still, it is important to keep the pigs entirely free from worms, and any precautions taken will be amply rewarded by healthier hogs and bigger profits. No investigation work has been carried on, up-to-date, at this Station in regard to control of worms, but it would be an oversight if some mention, as a word of warning, were not made. It will be well worth while for all breeders to acquaint themselves with the simple remedies recommended for prevention and cure of worms by other investigators.

Lung-Worm. This parasite is a serious menace to the swine herd and is difficult to eradicate when once established. The practice of sprinkling lime in the bedding is to be recommended, but the supplying of fresh uncontaminated soil for the young pigs that have come from clean farrowing-pens is the only sure means of successfully combating the lung-worm.

The practice of supplying fresh pasture each year and ploughing and liming the runs near the pens is to be recommended regardless of whether or not the herd is infested with either of these internal parasites and if such methods of management are followed it is unlikely that trouble from this source will arise.

Lice. Lice are the most common external parasites and when present in large numbers are quite harmful; yet they are easily controlled if taken in time, and the fact must not be lost sight of that while one or two dressings of a light non-irritant oil, such as pale paraffin No. 1, may destroy the actual lice, there are others in embryo that will hatch out later and start the trouble all over again unless the applications are repeated. Care should also be taken to have all litter renewed in the pen, and the pen thoroughly cleaned, as infested litter

and pens will be a constant source of trouble. Lice are usually found on the back, behind the ears, and under the limbs and are easily located on white pigs, but a close examination is necessary to locate them on the coloured breeds.

SUNSCALDING. While this is not a parasite or a disease it is nevertheless a condition that should be treated immediately, and is another case of prevention rather than cure, although curative treatment can, and must, be applied. The chief preventive is to maintain a thrifty hog of high-quality skin and hair, and the cheapest and most effective cure is the application to the scalded parts of crude fish oil, seal oil, or even worn-out oil from the crank-case of the motor-car or tractor. At this Station the Yorkshire and Tamworth are the only breeds that have experienced this trouble, and in these it is only the slightly unthrifty pig, always present in large herds, that has been affected. Allowing young pigs in rape pasture when the leaves are wet with dew or rain seems to have a tendency to cause more or less scalding during hot weather, although here again, the good thrifty pig will not be seriously affected.

SUMMARY OF SOME OF THE MAIN POINTS IN THE PRECEDING PAGES

1. Yorkshires are the most prolific, and make more economical gains than either Berkshires or Duroc-Jerseys.
2. Of the different grains used for feeding weaner pigs, oats produced the most economical gains. Other results indicate that much better results are secured if the hulls are removed from the oat chop, or hulless oats fed.
3. The earliest farrowed pigs, both spring and fall, usually strike the best market. Fall litters should be farrowed before September 15.
4. Pigs have been raised fairly successfully at all seasons at this Station.
5. With our present type of hogs, it is difficult to produce a high percentage of "select" hogs on the self-feeder.
6. The most economical gains are made by hand-feeding, when the influence of feeding methods on type is considered.
7. Under average winter climatic conditions better and more economical gains can be made by feeding hogs out-of-doors with well-banked cabins for sleeping-quarters.
8. Pasture is essential to the most economical gains.
9. Frosted wheat can be used profitably for feeding hogs.
10. (1) Alfalfa, (2) oat-and-rye mixture, and (3) rape are the three best hog pastures, under central Alberta conditions.
11. Exercise is very important for brood sows, breeding boars, and the development of breeding stock.

PUBLICATIONS ON SWINE HUSBANDRY

The following publications of the Department of Agriculture relating to swine husbandry are available on application to the Publications Branch, Department of Agriculture, Ottawa:—

Breeding and feeding of the market hog.. .. .. .. Pamp. 74, N.S.
Fall Litters.. .. .. Pamp. 63, N.S.
Feeding Stuffs, Purchasing of.. .. .. Ex. Cir. 88.
Goitre, How to Prevent.. .. .. Cir. 3, N.S.
Hog and Hog Grading, Handbook on the Bacon.. .. Pamp. 40, N.S.
Hog Cabin, the All-Year.. .. .. Ex. Cir. 101.
Hog Cholera.. .. .. Pamp. 54, N.S.
Hogs, The Self-feeder for.. .. .. Sp. Cir. 15, E.F.
Live Stock, Feeding of.. .. .. Ex. Cir. 33.
Piggery, The Farmer's.. .. .. Ex. Cir. 96.
Swine, Feeding of.. .. .. Ex. Cir. 60.
Swine Husbandry in Canada.. .. .. Bul. 10, N.S.

A full list of the publications relating to animal husbandry may be obtained by writing for the List of Publications.

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